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How soy labeling influences preference and taste

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Abstract

Using a “Phantom Ingredient” taste test, this article demonstrates how the use of soy labels and health claims on a package negatively biased taste perceptions and attitudes toward a food erroneously thought to contain soy. Consumers who ate products which mentioned soy on the package described the taste more grainy, less flavorful, and as having a strong aftertaste compared to those who ate the product but saw no soy label. Yet, while putting “soy” on a package negatively influenced taste-conscious consumers, when combined with a health claim, it improved attitudes among consumers who are health-conscious, natural food lovers, or dieters. Our results and discussion provide better direction for researchers who work with ingredient labeling as well as for marketers who work with soybean products. © 2001 Elsevier Science Inc. All rights reserved.

1. Introduction

While soy-based foods are increasingly perceived as a healthy food choice (Putnam, 1993), many consumers tend to dislike the taste of soybean. This taste-health discrepancy becomes even more vivid when analyzing how many healthy foods have good trial rates but poor repeat sales (Thayer, 1996). Insights from research on both nutrition labeling and on blind taste tests can help better understand this taste-health discrepancy with soy-related foods.

Much of the research on the utilization of nutrition labels has examined whether consumers want nutrition information (Bender & Derby, 1992), how consumers understand and use nutrition labels (Feick et al., 1986; Jacoby et al., 1977), and how these labels influence usage

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(Wansink, 1996; Wansink & Gilmore, 1999). Little research, however, has focused on how labeling influences perceptions, taste, and purchase intentions, and how this might vary across consumer segments. The purpose of this article is to discover (1) how soy labeling influences consumers' tastes and perceptions, and (2) what groups are most influenced by soy labeling.

After reviewing the literature on taste tests and labels, a Phantom Ingredient study is conducted which varies the labeling of a commercial product. Results indicate that soy labels negatively bias the taste of a product, but it is necessary in order to make health claims believable. Soy labeling negatively influenced taste-conscious consumers, but when combined with health claims they increase attitudes and purchase intentions among consumers who are health-conscious, natural food lovers, or dieters. Our results and discussion provide better direction for researchers who work with ingredient labeling as well as for marketers who work with soybean products.

2. Background

The 1974 Pepsi Challenge demonstrated that visual cues such as packaging and a brand's logo can influence consumers' product preference and perceptions (Foley, 1994). In any blinded taste test of this kind consumers have to evaluate products solely on their perceptions of the products' intrinsic cues, such as taste, texture, or aroma. For instance, consumers have limited ability to pick their preferred beer brands given no brand cues (Allison & Uhl, 1964). In contrast, some research indicates that consumers *can* discriminate systematically among brands using only taste and aroma cues (Uhl & Mauser, 1979; Jacoby et al., 1971). However, it is widely accepted that consumers in low involvement situations tend to use extrinsic cues rather than intrinsic attributes of the product to make product choices (Petty et al., 1983). As a result, in a blinded taste test involving soy, we expect that consumers would overrely on the soy label and let this influence their preferences, perceptions, and taste toward the product.

Much of the research on labeling has focused on how consumers use nutrition labels (Bender & Derby, 1992; Feick et al., 1986; Jacoby et al., 1977). For instance, Moorman (1990) studied how consumer characteristics (e.g., familiarity and enduring motivation) and stimulus characteristics (e.g., information format and content) influenced the utilization of nutrition information. Not surprising, higher levels of knowledge and awareness were found to have a positive main effect on information acquisition from nutrition label reading (Derby & Fein, 1994; Moorman & Matulich, 1993). According to Szykman's (1997) proposed conceptual model of the use of nutrition labels and on-package claims, knowledge, perceived diet effectiveness, health status, and skepticism toward claims are all hypothesized to be significant in explaining the use of package claims and nutrition labels.

On-package health claims and nutrition label information appear have independent effects on consumption. For example, packages with health claims were perceived as significantly more "heart healthy" than packages without health claims regardless of the nutrition information provided or the format used (Ford, 1994). Nutrition labeling is also important, however, since it may affect consumers' perceptions of product quality and preference

(Asam & Bucklin, 1973). As such, we expect that soy labeling may influence consumers' preferences for and perceptions of a product as well as taste expectations.

However, food labels also can play important third-party roles in the food marketing system through their impacts on product design, advertising, consumer confidence in food quality, and consumer education on diet and health (Caswell & Padberg, 1992). Thus, marketers should note on-going changes in the current levels of information on and use of food labels, in the new regulatory environment related to food labels, and in the strategic responses of food producers, processors, distributors, and consumers as well because food labels can signal product quality and shape new consumer knowledge, purchasing, and usage patterns (Caswell, 1992; Caswell & Mojduszka, 1996).

3. Data and method

3.1. Subjects and design

To better examine how labeling influences product taste perceptions and evaluations as well as what groups are the most influenced by labeling, we designed a 2×2 between-subjects experiment where soy label ("contains 10 g of soy protein" vs. "contains 10 g of protein") was crossed with a health claim ("May help reduce the risk of heart disease" vs. no health claim). Subjects were randomly assigned to one of the four experimental conditions.

Of the 155 subjects who participated in the experiment, 45% were homemakers from the Midwest (average age of 31.2; 74.3% female) who received \$6 donation for their participation, and 55% were undergraduate students (average age of 20.3; 52.4% female) from 11 different states and 8 different countries who received course credits for their participation. This combination of subjects was selected because demographic studies for nutrition bars indicate that 18–25 year olds and working mother represent the two primary markets that purchase nutrition bars for either themselves or for their families. While the two groups are demographically different, we did not expect them to be differentially influenced by the labeling conditions we were testing.

3.2. Procedure and treatments

We manipulated four different front label conditions (soy label vs. no soy label; health claim vs. no health claim) on a brand name nutrition bar which contained no soy protein as an ingredient. During the experiment, we began by asking the subjects to answer a questionnaire about their general food product preferences (9-point scale). After completing the general food product preference questions, each subject was shown one of the four different packages, and was asked to write down their thoughts and feelings toward the product (open-ended responses). The subjects then tasted the product, and were asked to write down their thoughts and feelings about the product. Following this, they were asked quantitatively-scaled questions about taste perceptions, attitudes, and purchase likelihood (9-point scale).

Conducting taste tests in this manner is conservative because consumers have sometimes been shown to underweight a consumption experience and overweight the information on a

label (Wansink & Kim, 2001) or advertisement (Chandon, Wansink, & Laurent, 2000). Thus, we can examine how strongly soy labeling influences product and taste perceptions. The taste test will also indicate whether merely claiming a product contains soy can bias a consumer's taste and perception of a product that, in fact, has no soy in it. In this "Phantom Ingredient" blinded taste test, we claimed the nutrition bar contained soy even though it was actually a soy-free product. By blind testing the subjects when they tasted the product we could measure the effects that a soy label alone has on the perception and taste of a nonsoy nutrition bar.

3.3. Data analysis

Of the 155 subjects who completed the questionnaire, 142 responses (92%) were usable and were included in the statistical analysis. To analyze the open-ended questions, the subjects' cognitive responses were coded by two independent coders who were blind to the experiment condition. Disagreements between the two independent coders were resolved through discussion (intercoder agreement rate = 85%). The subjects' prior perceptions were grouped into four different categories: taste perceptions (e.g., taste, texture, and flavor perception related), health or energy claim perceptions (e.g., (dis)beliefs about the health or energy claims), nutrients perceptions (e.g., protein, calories, and fat contents related), and ingredients perceptions (e.g., soy related).

ANOVAs were used to examine whether soy labeling influenced the subjects' taste perceptions and product evaluations differ. To examine this, a discriminate analysis was first conducted to categorize subjects in to a "taste-conscious" segment and a "health-conscious" segment. Analyses was conducted on separate groups of the subject, the one for a taste-conscious segment and the other for a health-conscious segment.¹ Last, we evaluated buying intentions of different consumer segments in each of four experiment conditions to examine whether soy labeling has more influences on particular consumer segments than the others.

4. Results

4.1. How does labeling influence product and taste perceptions?

The subjects' product perceptions prior to actual consumption experience were coded and categorized into four different product descriptions: taste-related, health-related, nutrient-related, and ingredient-related perceptions. Table 1 indicates how the subjects perceive the brand of nutrition bar under the four different label conditions. Our results indicate that labeling influences the subjects' perceptions of the product with regard to the favorable impact on health and on energy ($X^2 = 3.616$; $p < .01$) and the unfavorable aspects of ingredient-related perceptions ($X^2 = 2.956$; $p < 0.10$).

While the latter implies that soy labels have negative influences on product perceptions, we also discovered some positive influences. The subjects tended to view the health and energy aspects of the nutrition bar with less skepticism when soy was mentioned on the front label (e.g., soy-health (19%) versus no soy-health (46%); soy-no health (4%) versus no

Table 1
How does labeling influence product perceptions?

Valence ^a	Open-ended Cognitive Responses (Total = 142 Respondents)	Soy Label		No Soy Label		Chi-sq.
		Health Claim	No Health Claim	Health Claim	No Health Claim	
Favorable Comments	Taste, Texture, and Flavor (<i>n</i> = 3)	33%	33%	0%	33%	.750
	Health and Energy (<i>n</i> = 15)	20%	33%	40%	7%	3.616*
	Protein, Calories, and Fat Contents (<i>n</i> = 13)	23%	8%	39%	31%	.442
Unfavorable Comments	Soy as an Ingredients (<i>n</i> = 0)	—	—	—	—	—
	Taste, Texture, and Flavor (<i>n</i> = 39)	21%	26%	28%	26%	.244
	Health and Energy (<i>n</i> = 26)	19%	4%	46%	31%	1.110
	Protein, Calories, and Fat Contents (<i>n</i> = 14)	43%	21%	21%	14%	.062
	Soy as an Ingredient (<i>n</i> = 19)	42%	37%	21%	0%	2.956*

^a The subjects' product perceptions were first categorized into favorable and unfavorable comments and then were categorized into the four basic product attribute-related perceptions.

* $p < .10$.

soy-no health (31%)). In other words, a soy label helps make health claims on the package more believable.

4.2. How does labeling influence taste- and health-conscious consumers?

ANOVA results of the subjects' taste-related perceptions are presented in Table 2a and Table 2b. Because the subjects' actual consumption experience could overshadow the effects of labeling (Hoch & Ha, 1986), we decided to divide the overall sample into two separate

Table 2a
How does labeling influence taste-conscious consumers?

Taste Perceptions/Product Ratings	Soy Label		No Soy Label		F-values		
	Health Claim (<i>n</i> = 15)	No Health Claim (<i>n</i> = 15)	Health Claim (<i>n</i> = 15)	No Health Claim (<i>n</i> = 15)	Soy	Health	Soy × Health
I like the taste	2.6	2.3	2.9	4.0	3.557*	.715	1.865
I like the texture and consistency	2.1	1.9	2.0	3.1	1.712	1.332	2.138
It is expensive	5.6	6.5	6.5	7.1	2.206	2.625	.073
It is natural	5.5	5.3	5.2	5.0	.236	.133	.000
It tastes better than expected	3.2	2.4	3.6	4.8	5.855**	.140	2.963
It is healthy	5.6	6.3	6.1	6.4	.460	1.278	.278
I like the appearance	2.8	3.0	4.1	3.6	3.536*	.072	.451
I feel good eating it	2.4	2.1	4.1	3.5	7.135**	.661	.121
I am likely to purchase it	1.9	2.1	2.7	3.3	4.707**	.593	.122
Times to buy per year	.3	.4	1.3	3.1	4.038**	1.010	.742

Note. Taste perceptions and product ratings were measured on a 9-point scale (1 = strongly disagree; 9 = strongly agree). Likelihood of buying was measured on a 9-point scale (1 = very unlikely; 9 = very likely) and times to buy per year was measured on ratio scale.

** $p < .05$. * $p < .10$.

Table 2b
How does labeling influence health-conscious consumers?

Taste Perceptions/Product Ratings	Soy Label		No Soy Label		F-values		
	Health Claim (<i>n</i> = 12)	No Health Claim (<i>n</i> = 11)	Health Claim (<i>n</i> = 10)	No Health Claim (<i>n</i> = 10)	Soy	Health	Soy × Health
I like the taste	4.1	4.0	3.9	2.9	.625	.445	.319
I like the texture and consistency	3.3	4.0	3.5	2.2	1.059	.133	1.853
It is expensive	6.8	7.0	6.3	5.9	1.999	.019	.352
It is natural	4.8	5.4	4.2	5.3	.199	1.091	.133
It tastes better than expected	4.9	3.5	4.8	2.6	.357	5.070**	.206
It is healthy	5.6	6.8	5.5	5.6	.783	.824	.595
I like the appearance	3.5	4.8	3.2	4.1	.522	2.475	.088
I feel good eating it	4.1	4.5	4.1	2.9	.908	.264	.948
I am likely to purchase it	3.1	3.4	3.9	2.8	.023	.241	.685
Times to buy per year	2.0	5.5	13.1	6.8	1.179	.059	.392

Note. Taste perceptions and product ratings were measured on a 9-point scale (1 = strongly disagree; 9 = strongly agree). Likelihood of buying was measured on a 9-point scale (1 = very unlikely; 9 = very likely) and times to buy per year was measured on ratio scale.

** $p < .05$.

samples of taste-conscious and health-conscious consumer segments in order to examine some possible differences in their patterns of responses.

As is indicated in Table 2a, soy labeling negatively influenced taste ($F = 3.557$; $p < .10$), taste expectations ($F = 5.855$; $p < .05$), appearance ($F = 3.536$; $p < .10$), feelings about eating the product ($F = 7.135$; $p < .05$), buying intentions ($F = 4.707$; $p < .05$), and expected purchase frequency ($F = 4.038$; $p < .05$). Health claims however, had no influence on any taste perceptions or product ratings. These results suggest that the taste-conscious consumer segment is very sensitive to the soy labeling when it comes to a nutrition bar consumption.

In contrast, soy labeling did not have any negative effects on the taste-related perceptions and product ratings of the health-conscious consumer segment (see Table 2b). These results confirm that the taste-conscious consumer segment is more sensitive to soy labeling than the health-conscious segment and that with health claim we can raise the favorableness of after-taste level of the health conscious consumer segment.

4.3. Who is most influenced by labeling?

To better examine which consumer segments are most influenced by soy labeling, we made comparisons of the buying intentions among the subjects who considered themselves taste-conscious, health-conscious, natural food lovers, and dieters. ANOVAs for the four separate segments were conducted.² Table 3 shows that the presence of a soy label has a negative influence on the buying intentions of the taste-conscious consumer segment regardless of health claim ($F = 4.707$; $p < .05$). Interestingly, while neither soy labeling nor health claims influenced the health-conscious, natural food lover, and dieter segments, these

Table 3

Who is most influenced by soy labeling?

Consumer Segments and Their Buying Intentions ^a	Soy Label		No Soy Label		F-values		
	Health Claim	No Health Claim	Health Claim	No Health Claim	Soy	Health	Soy × Health
Taste-conscious Segment (<i>n</i> = 60)	1.9	2.1	2.7	3.3	4.707**	.593	.122
Health-conscious Segment (<i>n</i> = 43)	3.1	3.4	3.9	2.8	.023	.241	.685
Natural Food Lover Segment (<i>n</i> = 75)	2.9	2.8	3.4	2.7	.095	.482	.332
Dieter Segment (<i>n</i> = 53)	3.5	2.6	3.3	2.8	.001	.965	.085

Note. A simple mean split method was used to identify a consumer segment. Buying intention was measured on a 9-point scale (1 = very unlikely; 9 = very likely).

** $p < .01$.

^a Consumers could be classified as being in more than one segment.

segments were generally more favorable toward the product to begin with. These results may provide a starting point to marketer who want to develop market segmentation strategies for soy-based packaged foods. When combined with how influence perceptions, this shows soy claims can be beneficial to targeted market segments when combined with a health claim.

5. Discussion and implications

To examine how package labeling influences preference and taste, we conducted a new product taste test varying front label conditions on a constant soy-free product. This study enabled us to complement previous nutrition labeling research since we used two different statements, a soy label and a health claim, simultaneously on the front label. The results generally support our expectations about the relationship between labeling and preference, perception, and taste. In general, a soy label negatively influences the perceptions and taste of consumers, especially taste-conscious consumer segments. However, before we can draw specific conclusions from this study, we need to note how the limitations of the research design and method constrain the generalizability of the findings. Because the key manipulations (soy label and health claim) were operationalized in a controlled environment, the robustness of these results should be investigated in a series of field studies. Also, while there is a nice diversity of subjects in this sample (homemakers and undergraduates from 11 states and 8 countries), further research could be done to broaden the generalizations.

5.1. Theoretical and methodological implications

The results of this article underscore how labeling influences preference and taste. We have shown that soy labels and health claims significantly influenced perceptions and taste. Thus, labeling has direct relevance for the branding and advertising strategies of products.

Blind taste tests often used in expectation-disconfirmation research can raise the salience of ingredients or of attributes and can artificially inflate or deflate some results. We

developed a “Phantom Ingredient” blind test procedure in order to elicit consumers’ perceptions of a product without increasing the sensitivity to that ingredient (since the ingredient is not actually included in the product). This new procedure helped to measure the pure effects that labeling has on consumer perceptions, even after the actual consumption experience occurred.

5.2. Managerial implications

This article provides two important insights into how the presence of a soy label influences product perceptions and taste, while also addressing who is most influenced by soy labels. First, we found that even though soy labels generated some negative perceptions, it also helped decrease skepticism toward health-related claims. Therefore, using both soy labels and health claims together may neutralize negative preferences and perceptions that might result from using either alone.

Conversely, however, the taste-conscious consumer segment is the segment most negatively influenced by soy labeling. Marketers can develop particular safety strategies when marketing soy-based packaged foods to this sizable segment. Manufacturers can emphasize other ingredients which override the negative perceptions of soy (Wansink, 1994). Evocative packaging, logos, and brand name characters have helped ease the acceptance of products, partly because they reduce the counterarguing. Similarly, product and situation comparisons help distract consumers from the negative perceptions they might have of soy (Wansink & Ray, 1996). In addition, managers can emphasize health-related claims more strongly than they emphasize soy as an ingredient, or they can find host-products which override the perceived taste of soy.

6. Summary

Over the past few years research interest has been shifting away from whether consumers use nutrition labeling toward how nutrition labeling influences consumers. We focused on how soy labels and health claims in conjunction influence consumers’ product preferences and examined what consumer groups are most influenced by the labels. We used a “Phantom Ingredient” blind test, which revealed how different combinations of front labels influence consumers’ perceptions of a product. Results indicate that a soy label generates unfavorable product perceptions about an ingredient. A soy label also influences the taste-conscious consumers in their taste and texture perceptions as well as their purchase times and buying intentions.

Notes

1. Discriminate analyses were used to classify subjects based on their answers to questions regarding the importance of health, the importance of taste, and to the extent to which they trade-off health for taste. Of the 142 subjects, 39 could not be clearly

categorized as belonging to either a taste-conscious segment or to health-conscious segment. represents a group of the subjects who were selected if $Itaste * Bhealth$ is greater than the average and $Ihealth * Btaste$ is smaller than the average.

2. Again, a mean split method was used to choose each of four consumer segments. For example, natural food lover segment was selected from the subjects who gave a higher rating than the average (5.6) to the question that I like natural foods, and dieter segment was selected from the subjects who gave a higher rating than the average (3.1) to the question that I am on a diet. For taste- and health-conscious segment, see the first footnote.

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